

SDMS # 88038192

Five-Year Review Report

First Five-Year Review Report
for
Westinghouse Superfund Site
Sunnyvale, CA

September 2001

PREPARED BY:

United States Environmental Protection Agency
Region 9
San Francisco, California

Approved by:

Date:

Keith Takata

9-28-01

Keith Takata
Superfund Division Director
U.S. EPA, Region 9

I. Introduction

The purpose of this document is to provide a Five-Year Review for the Westinghouse Superfund Site in Sunnyvale, California and to determine whether the remedy at the site is protective of human health and the environment. This statutory Five-Year Review is being conducted pursuant to CERCLA section 121(c) and NCP section 300.400(f)(4)(ii) when the remediated waste will remain onsite after completion of the remedy at levels which preclude unlimited usage and unrestricted exposure. This is the first Five-Year Review for the Westinghouse Site.

II. Site Chronology

Table I - Chronology of Site Events	
Westinghouse Electric Corporation conducts study to determine the extent and nature of PCB soil contamination on the site.	1981
Lead Agency California Water Quality Control Board orders and oversees investigation and remediation of PCB contaminated shallow soils in Reservoir 2 area, railroad spurs and fence line on the site.	1981 - 1987
Final listing on the EPA National Priorities List	6/1/1986
EPA assumes lead oversight role	12/18/1987
Administrative Order of Consent for the Remedial Investigation and Feasibility Study signed by Westinghouse and EPA.	8/24/1988
Public notice of Feasibility Study completion and EPA proposed plan for remedial action; start of public comment period.	6/1/1991
ROD selecting preferred remedy is signed.	10/16/1991
Westinghouse initiates Remedial Design pursuant Administrative Consent Order.	2/6/1992
Phase I soil remediation begins; soil excavation and removal.	10/1992
On-site Pilot groundwater extraction and treatment system installed.	12/1992
EPA issues Remedial Design and Remedial Action Administrative Order for remediation activities to commence.	9/29/1993
PRP Final Remedial Design for soil and groundwater remediation approved by EPA (Phase 2)	6/28/1994
PRP's Phase 2 Remedial Action Work Plan approved by EPA	8/24/1994
Start of Phase 2 on-site construction activities (soils remediation, tank removal and final groundwater extraction and treatment system)	10/1994
ESD issued by EPA for expanded soils remediation and groundwater monitoring in the North Parking Lot area of the site.	3/14/1997

Table I - Chronology of Site Events	
Pre-final inspections of Phase 2 and ESD remedial actions	12/1998 8/2000
Preliminary Close Out Report signed	9/27/2000
Water Treatment System inspections	1/2000 8/2000 7/16/2001

III. Site Background

Physical Characteristics

The Westinghouse facility sits on a 75-acre parcel of land, located at 401 Hendy Avenue in Sunnyvale, California. The site is bounded by California Avenue to the north, Hendy Avenue to the south, North Sunnyvale Avenue to the west, and North Fair Oaks Avenue to the east. A parking lot, which is located across the street from the 401 Hendy Avenue address, on California Avenue, is also part of this property. (Attachment A-Figure 1)

The subsurface of the Westinghouse area is composed of alluvial sand and gravels with silt and clay layers. The hydrogeology of the area is highly heterogeneous. There are two shallow groundwater aquifers, known as the A and B1 zones, with water levels ranging in depth from 25 feet to 150 feet below ground surface. (1992 groundwater levels) An aquitard with a 5 to 8 feet thickness also separated the A and B1 aquifer zones. The regional topography is also characterized as sloping gently downward, north-north east toward the San Francisco Bay. The entire facility is approximately 5 miles south of the San Francisco Bay and five miles northeast of the Santa Clara Mountains.

Land and Resource Use

Historically, the current property has been zoned for industrial use since 1906. In the mid-1950's, Westinghouse set up transformer manufacturing operations. The company later expanded to include the manufacture of steam generators and missile defense and marine propulsion systems for the military until 1996. Northrop Grumman Marine System Corporation acquired the property on March 1, 1996, and conducts similar operations.

The surrounding area is currently zoned for commercial, residential and industrial use. However, the area is primarily residential. Some residential parcels are as close as 100 feet. Municipal and industrial water supplies are drawn from groundwater aquifers at levels below a depth of 250 feet below ground surface. Currently, no water is used for drinking from water levels above the 250 foot level.

History of Contamination

Westinghouse manufactured transformers utilizing Inerteen and mineral oil as thermal insulating fluids during its operations. Inerteen is a dense, non-aqueous phase liquid (DNPL) which contained approximately 60 percent polychlorinated biphenyl (PCB, Aroclor 1260) and 40 percent trichlorobenzene (TCB). The transformer manufacturing operations were located in the southeast section of the property, in the south and east sides of the Reservoir 2 area, near Building 21. The Inerteen was stored aboveground in a 7,000 gallon tank in this area, along with three 16,000 gallon aboveground tanks and one 20,000 gallon underground storage tank. These liquids were delivered to two areas within Building 21 through underground pipes. The Inerteen tank was removed in 1971,

and the mineral oil tanks were removed some time before 1974. However, the operations over time resulted in the contamination of the soil and shallow groundwater aquifers in the Reservoir 2 area. PCB contamination also occurred in the northwest and northeast areas of the facility yards, portions of the fence lines and along the railroad tracks near Building 61.

Initial Response & Basis for Action

As a result of public concern about PCB contamination, Westinghouse conducted an investigation in 1981 on the site to determine the nature and extent of contamination on the site. The lead agency overseeing the Westinghouse investigation was the California State Water Resources Quality Control Board. The Board ordered the removal of PCB contaminated shallow soils along property fence lines and nearby railroad spurs, in 1984 and 1985. The Westinghouse site was proposed for listing on the Federal Superfund National Priorities List (NPL) in October 1984, and finalized on this list on June 1, 1986. EPA assumed the lead oversight role on December 18, 1987. On August 24, 1988, the EPA and Westinghouse signed an Administrative Order on Consent which initiated the Remedial Investigation and Feasibility Study (RI/FS) of this site. The completed study and the EPA proposed plan for site remediation were presented to the public for comment on June 1, 1991.

Contaminants identified during the RI as the chemicals of concern (COCs) in both the groundwater and soil included:

Benzene	Ethylbenzene
Chlorobenzene (CB)	Polychlorinated biphenyls (PCBs)
1,2-Dichlorobenzene (1,2-DCB)	Toluene
1,3-Dichlorobenzene (1,3-DCB)	1,2,4-Trichlorobenzene (1,2,4-TCB)
1,4-Dichlorobenzene (1,4-DCB)	Trichloroethane (1,1,1-TCA)
1,2-Dichloroethane (1,2 DCA)	Trichloroethene (TCE)
1,1-Dichloroethene (1,1 DCE)	Xylene
cis 1,2-Dichloroethene (cis-1,2 DCE)	

Both soil and groundwater with the highest concentrations were discovered in Building 21 and in the area south of Reservoir 2 (source area), which is where the tanks were located. Most of these contaminants leaked from the storage tanks located south of Reservoir 2, and from underground pipelines which delivered the chemicals to Building 21 for use in the manufacturing processes. PCB's in soils generally ranged up to 28,000 parts per million (ppm) from the surface to approximately 45 feet below ground surface. Investigations also indicated the presence of PCBs along the top of the A/B1 aquitard. A DNAPL thickness of 2.8 feet was discovered in well W48, and a light non-aqueous phase liquid (LNAPL) thickness of 1.1 feet was found in well W3, which is located approximately 70 feet east of the former Inerteen tank. The solubility limit of 2.7 ppb for PCB was frequently exceeded in the other wells on site. VOC concentrations ranged up to 131 ppb in groundwater. (Attachment A - facility map, Figure 2)

IV Remedial Actions

Remedy Selection

On October 16, 1991, the Regional Administrator signed a Record of Decision (ROD), selecting the following remedy:

1. Permanent containment, by means of groundwater extraction, of contaminated groundwater in the source area where DNAPLs are detected;

2. Restoration of contaminated groundwater, using extraction, to the California Department of Health Services (CDHS) Action Level for 1,3-DCB, the proposed maximum contaminant levels ("MCL") for 1,2,4 TCB and the Federal and state MCLs, with the exception of the standard for PCB(0.5 ppb) in the onsite source area where DNAPL occurs;
3. Treatment of the extracted groundwater to meet all applicable or relevant and appropriate requirements ("ARARs") identified in the ROD for this discharge, prior to discharge to the onsite storm sewer, unless an evaluation indicates that an alternative "end-use" for the treated effluent (such as use for facility process water) can be practicably implemented;
4. Removal of contaminated soil containing greater than 25 parts per million PCB to a depth of eight feet;
5. Offsite incineration of excavated soils at a federally permitted facility;
6. Institutional controls, such as land use restrictions, to prevent well construction (for water supply purposes) in source areas that remain contaminated. Excavation below the eight feet where soil has been removed was to be restricted. Restrictions would also preclude excavation, other than temporary subsurface work in the upper eight feet and will require complete restoration of any disturbed fill or the asphalt cap once any such temporary work was completed;
7. A requirement that EPA receive notification of any future intention to cease operations in, abandon, demolish, or perform construction in (including partial demolition or construction) Building 21 (see facility map, Figure 2);
8. Monitoring of the affected aquifers to verify that the extraction system is effective in capturing and reducing chemical concentrations and extent of the aqueous phase plume and in containing aqueous phase contamination in the DNAPL source area.

The estimated cost of the remedy in the ROD was \$8,300,000. The cleanup plan outlined in the ROD includes leaving contamination above health-based levels in both soil and groundwater on the Site. In the absence of a known technology to effectively remove the DNAPL containing PCB from the shallow aquifer, a technical impracticability waiver was invoked in the ROD. This legal mechanism waived the requirement to meet the standard for PCB in the source area of the DNAPL. The ROD requires that this area be permanently contained and that land use restrictions prevent access to this contamination. Compliance points were set at the perimeter of the DNAPL source area in the groundwater.

Soil cleanup levels were determined based on the historical industrial use of the property and the possibility of workers coming into contact with contaminated soil. The aquifers were classified as a potential drinking water source. Although cleanup numbers were based on industrial use, the ROD evaluated the hypothetical future residential scenario for potential exposure to COCs in the groundwater and soil.

Remediation Oversight Actions

Westinghouse initiated a Remedial Design pursuant to a EPA-Westinghouse signed AOC on February 6, 1992. This was followed by Phase 1 soil remediation in October 1992 and installation of a pilot groundwater treatment facility in and surrounding the source area of contamination in December 1992. The Final Remedial Design for both soil and groundwater remediation was approved by EPA on June 28, 1994, and the Remedial Action Work Plan was approved on August 24, 1994. Phase 2 construction operations commenced October 3, 1994.

Groundwater Remediation

The purpose of installing the pilot scale groundwater extraction and treatment system during December 1992 was to gain immediate control of contaminant migration in the shallow aquifers, and to establish the operating parameters for the final groundwater extraction and treatment system. The system design was based on the estimated flow rates and groundwater chemistry from the wells. Groundwater from the pilot system was treated through a combination of cartridge filters and granular activated carbon vessels to remove contaminants.

The final groundwater extraction and treatment system was constructed between October 1994 and April 1995. This system includes the pilot system wells, eight A-aquifer hydraulic barrier extraction wells (E6, E7, E10, E11, E12, E14, W80, and W82) which are located in the alleyway between Building 21 and 31, and observation wells which monitor the performance of the A-aquifer extraction system.

Approximately 34,413 gallons per day of contaminated groundwater has been extracted and treated. The system flow rate averages 30 gallons/minute and the system treated 95,880,842 gallons of contaminated groundwater by December 2000. Approximately 91 pounds of PCB have been removed since system startup in December 2000. The treated groundwater is then discharged to the sanitary sewer under a wastewater discharge permit from the City of Sunnyvale.

The groundwater system has been effective in significantly reducing the COCs to the level of non-detect outside of the Source area, except for in two locations. An October 2000 sampling analysis indicated a PCB concentration level of 2.1ug/L and TCB level of 32ug/L in A-aquifer W42. This well is immediately down-gradient of Reservoir 2. W43 (located in Building 21) indicated a TCB concentration level of 110ug/L.

Soils Remediation

During October 1992, approximately 76 cubic yards of PCB contaminated soil and pipelines were removed from the area where the pilot groundwater treatment facility was constructed. The site was restored by backfilling the excavated trenches with clean soils and placement of asphalt pavement and slab for the groundwater remediation facility. The contaminated soil was sent to Aptus, Inc., in Aragonite, Utah for incineration, followed by landfill disposal of sludge and ash. A total of 27 samples were tested from the PCB pipeline trench, and 12 from the treatment facility foundation area.

Approximately 585 linear feet of pipeline containing mineral oil and Inerteen were excavated during 1992 and 1994 operations. During October 1994, approximately 425 linear feet of PCB pipeline were excavated. The pipelines were double and triple rinsed with kerosene and acetone, and then sent to a TSCA-permitted landfill for disposal. Another 948 tons of PCB contaminated soil was excavated and sent to the Aptus, Inc. incineration facility. A 20,000 gallon underground, mineral storage tank located 60 feet south of Reservoir 2 was also removed and transported for proper disposal in 1994.

Soil sampling and analysis was conducted from the pipeline trenches and tank area. Areas where analysis indicated PCB concentration levels exceeding the 25ppm limitation, were further excavated and resampled. Soil remediation was completed during March 1995.

North Parking Lot ESD/Remediation

On March 14, 1997, EPA signed an Explanation of Significant Differences (ESD), which amended the remedy for the North Parking Lot. The ESD required the following: 1) soils in the North Parking Lot area containing greater than 25 mg/kg PCBs be excavated for offsite disposal; 2) excavated soils containing less than 50 mg/kg PCBs be disposed of in a RCRA Subtitle C permitted landfill as non-hazardous waste; 3) soils containing 50 mg/kg PCBs or greater and less than 500 mg/kg PCBs be disposed of in a TSCA permitted landfill; and 4) soils containing 500 mg/kg PCBs or greater be treated in a TSCA permitted incinerator. The work began during April 1997 and was completed by during May 1997. Thirty-one truckloads (1,378,000 lbs) of waste soil, gravel, and pavement were excavated and disposed of offsite to an industrial (non-hazardous) landfill. Ten railroad gondola boxes containing contaminated soil (339,667 lbs) were shipped to a TSCA hazardous waste landfill. Two truckloads of soil (93,611 lbs) were shipped for disposal by incineration. Soil sampling conducted during the North Parking lot excavation followed the same protocol outlined in the 1994 excavation.

During 1992 wells W68, W76, and W77 were installed in the North Parking Lot by Westinghouse to determine whether groundwater contamination resulted from the soil contamination present in the North Parking Lot. The wells were sampled for PCB's only and no PCB's were found in 1992. EPA requested that Northrup (who had purchased Westinghouse) sample the wells again prior to selling the North Parking Lot to Valin Corporation. Subsequent sampling showed the presence of 10 ppb TCE in Well W68. As a result of this finding, EPA requested the Northrup further investigate soil and groundwater in this area for the presence of VOCs. During 1997 Northrup submitted information to EPA regarding their soil and groundwater monitoring in this part of the site. Three new groundwater monitoring wells were installed, none of which found detectable levels of TCE. The level of TCE in well W-68 began to decline and by the end of 1998 it was at 0.5 ppb TCE (approximately the analytical detection limit). While monitoring of wells in the North Parking Lot area continues, the low levels of TCE that have been found do not warrant additional remediation.

Building 21 Investigation and Remediation

Provisions in the 1991 ROD required notification to EPA regarding any construction within Building 21. Remediation activities conducted in 1994 and 1995 stopped at the edge of Building 21, but the pipelines continued another 40-50 feet inside the building, and soil contamination was found up to the edge of Building 21. EPA requested that subsurface soil sampling be conducted in the area where the former PCB pipelines pass into Building 21 at the Building 21 breeze way, and the southeast end of Building 21. During November 1999, EPA received a letter from ALTA Geosciences, Inc. (a consultant representing Northrup Grumman) titled "Work Plan Building 21 Soils Investigation". This letter summarized the investigations to be conducted in Building 21 to identify possible contamination.

On December 9, 1999 three soil borings were taken in the Building 21 breeze way and two soil borings were conducted along the pipeline at the southeast corner of Building 21. In addition, four additional groundwater monitoring wells were installed in Building 21. Six soil samples were collected from the borings in the Building 21 breeze way, and 14 soil samples were collected from the southeast corner locations. Analytical results received during January 2000 identified a significant detection of PCBs in the boring from the south east corner location (2,500 to 5,200 mg/kg). Consequently, on January 26th and 27th four additional borings were conducted to better delineate the extent of contamination in the southeast corner of the building.

Soils sampled from the breeze way area were at or below 1 ppm except for one sample at 0.5 feet which contained 38 ppm. In addition, October 1999 sample borings collected for the installation of wells in this area were completed to a depth of 41.0 feet. The results of this testing showed a non-detect for PCBs. On November 12, 1999, two geotechnical borings were also collected between the breeze way and the east end of building 21. Samples were collected from 2.5 feet and 5 feet and the analytical results showed non-detect for PCB's. As a result of the soil testing from the groundwater monitoring wells, it was decided that soils in the breeze way area did not warrant remediation.

The results of the soil borings on the southeast end of the building showed continued presence of PCB's in the soils. Samples from a boring depicted PCB's ranging from as low as 5 ppm up to 1200 ppm. Since the presence of PCB's in this area was consistently above 25 ppm it was decided that excavation was warranted in this area of Building 21. Northrop submitted the Building 21 Conditions Report during April 2000. The report was reviewed by EPA on April 10th, and EPA requested a work plan for the Building 21 Soils Remediation. The "Building 21 Soils Remediation Work Plan" was submitted on June 20th and subsequently approved by EPA in a meeting at Northrop during June 2000. Excavation began in Building 21 on August 1st and EPA conducted the final inspection on August 5, 2000. Confirmation sampling results demonstrated that the excavation removed all contamination above 25 ppm. The excavated area was approximately 7 feet wide by 15 feet long and in some areas went to a depth of 5 feet. This excavated area was backfilled with clean soil and a new floor was built. Seventeen thousand fourteen pounds (17,014) of soil went to the Safety-Keen (Aragonite) incinerator in Utah on September 26th, and on September 27th 17,925 pounds of soil went to a landfill owned by Chemical Waste Management in Kettleman Hills, CA.

Preliminary Site Close Out

A Preliminary Site Close Out Report, documenting the above-mentioned remediation activities and construction completion was signed on September 27, 2000.

V. Operation & Maintenance Follow up

ALTA Geosciences, Inc., a representative of Northrup Grumman, conducted an independent five-year review of the Final Groundwater Extraction and Treatment System. A report entitled, "Five-Year Groundwater Status Report: Westinghouse Sunnyvale Superfund Site, Sunnyvale, California", was prepared on February 2001. The report evaluates this system's effectiveness and the condition of the asphalt cap over the area of the site where PCB soils remain, and provides an updated feasibility analysis of potential technologies for improved groundwater remediation, as well as recommendations for operation and maintenance improvement.

Data in this report indicates a significant increase in the elevation of groundwater levels (10-15 feet) in the A-Aquifer Source area, between 1992 and 1998. The Extraction and Treatment System was designed based on 1992 water levels, which was discovered as below normal levels. As a result, the existing wells inadequately screen groundwater flows, the pneumatic pumps lack adequate capacity and they are primarily pumping clean water. New extraction wells should be installed to more efficiently contain aqueous phase contaminants.

The recommendations for upgrading this system and repair of minor cracks in the asphalt cap were reviewed and accepted by Northrup Grumman Marine Systems and EPA. System upgrades began July 9, 2001 and should be completed by the end of October 2001. The system changes being incorporated are as follows:

- (1) Existing Source Area Extraction Wells (E1 - E5): Replace pneumatic pumps with low flow electric submersible pumps for the sole purpose of DNAPL recovery; install three new hydraulic extraction wells (Wells A, B & C) within the perimeter of wells E1-E5 for full containment and extraction of aqueous phase contaminants.
- (2) Barrier System Wells: Cease existing operations after upgrade of the Source area wells, and only use as a backup system.
- (3) Treatment Plant Operations and Equipment: Replace existing cartridge filters with self-cleaning filters to control costs, and install a remote sensing system in the treatment plant headworks for improved monitoring of system maintenance or emergency repair needs.

(4) Source Area Pavement and Capping: Reseal or replace asphalt capping in areas which were identified during ALTA Geophysics evaluation of the site, as well as in those areas where pavement will have to be installed as a result of the groundwater system upgrade.

VI. Five-Year Review Process

Members of the five-year review team consisted of Rosemarie Caraway and Sharon Johnson of the EPA Region 9 Superfund Division. Ms. Caraway conducted site inspections of the water treatment system in January and August of 2000. She and Ms. Johnson jointly conducted another site inspection on July 16, 2001 to establish the progress being made on groundwater system upgrades and the completion timetable.

This five-year review consisted of a review of a number of relevant documents including, but not limited to the 1991 Record of Decision, remediation work plans, and operation and maintenance monitoring reports. (See Attachment B)

This five-year review report is being included in the Administrative Record for this site. A fact sheet will be prepared notifying the public of the availability of this report.

VII. Technical Assessment

The following conclusions support the determination that the remedial measures implemented are protective of human health and the environment.

Question A: Is the remedy functioning as intended by the decision documents?

The review of PRP documents, ARARs, and site inspections reveal that the remedy selected is functioning as intended by the ROD, and as modified by the ESD. However, some adjustments need to be made to the groundwater extraction system to improve efficiency. O&M activities which need to be completed include repair of cracks in the asphalt cap and upgrade of the treatment plant system.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

The exposure assumptions, toxicity data, cleanup levels and remedial action objectives are still valid. There are no changes in the ARAR's associated with this site.

However, one technical assumption of the remedy has changed. The groundwater level in the A-Aquifer Source Area significantly increased between 1992 and 1998. Since the Extraction and Treatment system was designed based upon the 1992 levels, it is not currently functioning as efficiently as possible. As a result, the treatment system was pumping and treating more clean water from the hydraulic barrier well locations than contaminated groundwater from the source area wells and potentially inducing DNAPL migration. Therefore, a re-design of the system is being implemented which better locates hydraulic extraction wells in the source area and discontinues pumping from the barrier wells.

Question C: Has any information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call the protectiveness of the remedy into question.

VIII. Issues

No issues are currently unresolved.

IX. Recommendations

The new extraction wells need to be installed, the use of existing barrier wells should be discontinued after the new wells are installed, the treatment plant upgrades should be performed and the asphalt cap should be repaired. These modifications and repairs should be completed by October 2001.

X. Protectiveness Statement & Next Review

I certify that the remedy selected for this site is expected to be protective of human health and the environment. Based on the expected continuing presence of contamination at this site at levels which preclude unlimited use and unrestricted exposure, the next Five-Year Review will be written within five years from the date of signature of this review.

ATTACHMENT A

**Westinghouse Superfund Site Maps
Sunnyvale, California**

LIST OF DOCUMENTS REVIEWED

Close Out Procedures for National Priorities List Sites, U. S. Environmental Protection Agency, EPA/540/R-95/062, OSWER Directive 9320.2-09, August 1995.

Explanation of Significant Differences, Westinghouse Superfund Site, EPA Region 9, March 14, 1997.

Fact Sheet #3, "Cleanup Begins at the Westinghouse Facility in Sunnyvale", U. S. Environmental Protection Agency, September 1994

Fact Sheet #4, "EPA Announces Opportunity to Comment on Explanation of Significant Differences at the Westinghouse Facility in Sunnyvale", U. S. Environmental Protection Agency, February 1997.

Final Groundwater Extraction and Treatment System Completion Report, Westinghouse Superfund Site, Sunnyvale, CA, EMCON, February 22, 1996.

Letter to Laurie Williams, EPA Regional Counsel dated May 20, 1993 regarding the North Parking Lot.

Letter to Rose Marie Caraway, EPA Remedial Project Manager dated August 5, 1994 regarding the North Parking Lot.

Letter to Rose Marie Caraway, EPA Remedial Project Manager dated March 8, 1996 from Northrop Grumman. "Overview of Northrop Grumman Corporation".

Letter to Rose Marie Caraway, EPA Remedial Project Manager dated August 9, 1996 from Northrop Grumman. "Northrop Response to EPA's April 1996 Memo and request for a meeting on September 13, 1996".

North Parking Lot Soils Remediation, Completion Report, Westinghouse Superfund Site, Sunnyvale, California, for Northrop Grumman Marine Systems, Alta Geosciences, Inc., June 1997.

Soil Sampling and Analysis Results, Building 44 Sump Abandonment, dated May 23, 1997, from Northrop Grumman, and Alta Geosciences, Inc.

Proposed Scope of Work for Building 44 Sump, Soil and Groundwater Investigation Report, Alta Geosciences, June 12, 1997.

Letter from Rose Marie Caraway, EPA Remedial Project Manager, dated July 9, 1997,

approving the Scope of Work for Building 44 Sump, Soil and Groundwater Investigation Report

Record of Decision, Westinghouse Superfund Site, Sunnyvale, California. EPA Region 9, October 16, 1991.

Remedial Action Workplan, North Parking Lot Soils Remediation, Westinghouse Superfund Site, Sunnyvale, California, for Northrop Grumman Marine Systems, Alta Geosciences, Inc., April 1997.

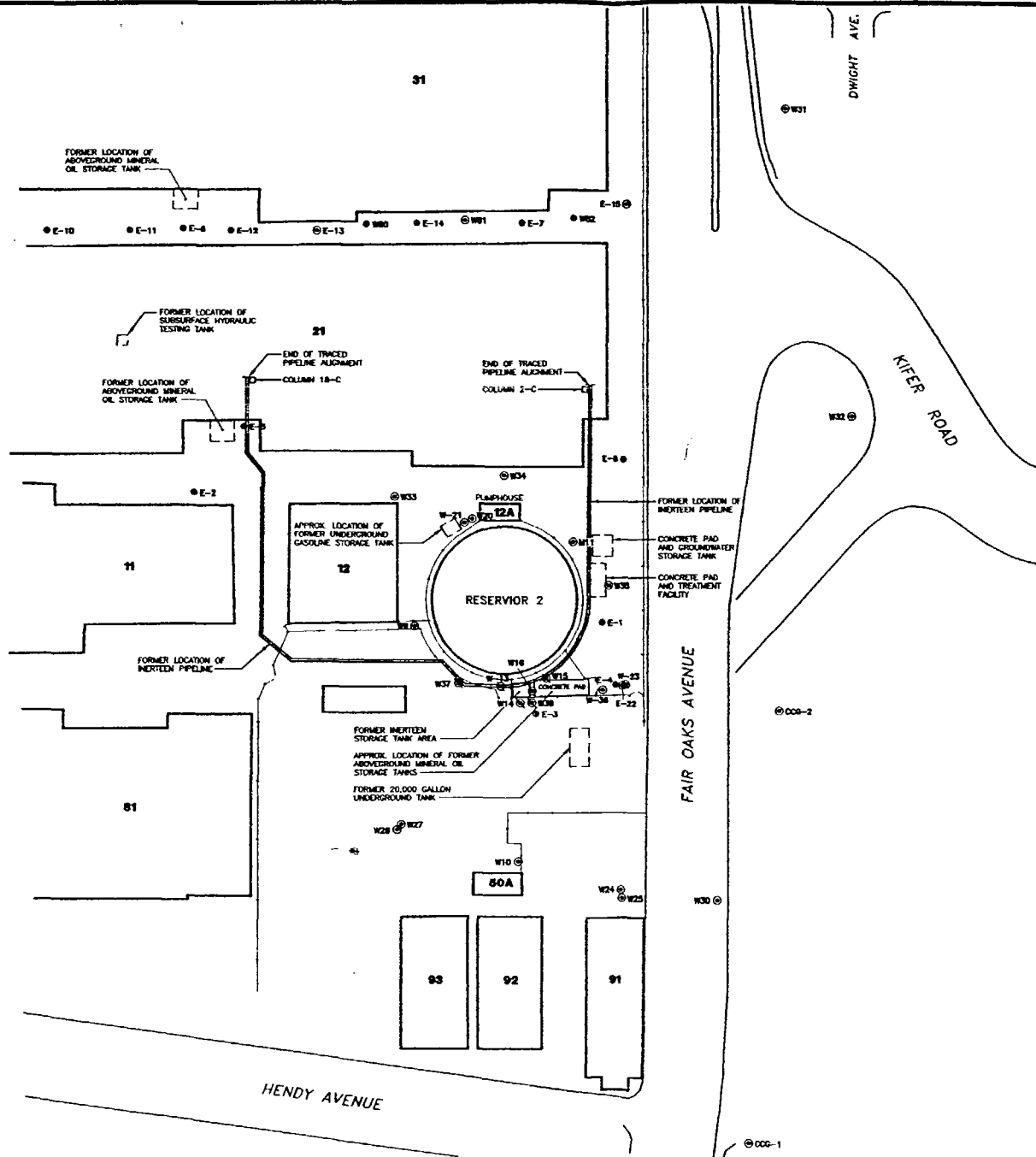
Soil Remediation Completion Report, Westinghouse Superfund Site, Sunnyvale, CA, Alta Geosciences, Inc, March 1996.

Record of Decision, Westinghouse Superfund Site, Sunnyvale, California, EPA Region 9, October 16, 1991.

Second 2000 Semiannual Groundwater Monitoring Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California, for Northrop Grumman Marine Systems, ALTA Geosciences, Inc., February 2001.

Five-Year Groundwater Status Report, Westinghouse Sunnyvale Superfund Site, Sunnyvale, California, for Northrop Grumman Marine Systems, ALTA Geoscience, Inc., February 2001.

Project Manual Groundwater Remediation System Modifications, Westinghouse Superfund Site, Sunnyvale, California, for Northrop Grumman Marine Systems, ALTA Geosciences, Inc., April 2001.



EXPLANATION

- ⊙ EXISTING MONITORING WELL
- EXISTING EXTRACTION WELL
- ⊘ ABANDONED MONITORING WELL

NOTES:

1. WELLS W80 AND W82 WERE CONVERTED TO EXTRACTION WELLS INSTEAD OF WELLS E13 AND E15 BASED ON RESULTS OF SHORT-DURATION STEP DISCHARGE TESTS PERFORMED IN NOVEMBER 1994 (EMCON, FEBRUARY 16, 1995).
2. WELLS W13, W14, W15, W37, AND W38 WERE ABANDONED IN SEPTEMBER 1994 BECAUSE THESE WELLS WERE WITHIN THE PROCESSED SOIL EXCAVATION LIMITS.
3. WELL W16 WAS ABANDONED IN APRIL 1989 DURING REMEDIAL INVESTIGATION AND FEASIBILITY STUDIES.



SCALE: 0 1" 2" FEET

WESTINGHOUSE ELECTRIC CORPORATION
SUPERFUND SITE
FINAL GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
SUNNYVAL, CALIFORNIA

SITE PLAN

FIGURE NO.
2
PROJECT NO.
B51-024.00